REMARKS

This Preliminary Amendment is in response to the Final Office Action dated June 20, 2005, and is requested to be entered in conjunction with the concurrent filing of an RCE herewith. In the Office Action, the Examiner rejected claims 1, 2, 4, 6-12, 14, 15, 17-20, 22, and 24 under 35 U.S.C. § 102(e) as being anticipated by Roeck *et al.*, U.S. Patent No. 6,574,796 (hereinafter *Roeck*). Claims 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Roeck* in view of Shahar *et al.*, U.S. Publication No. 2003/0002495.

Claims 1, 4, 7, 8, 11, 14, 15, 17, 19, 22 and 24 are amended as shown above. Specifically, independent claims 1, 11, and 19 are amended to more clearly recite features of the claimed invention. Claims 3, 6, and 9 are canceled herein without prejudice. New claims 25-29 have been added. Thus, claims 1, 2, 4, 7, 8, 10-12, 14, 15, 17-20, 22, 24, and 25-29 are now pending in the application. For the reasons set forth below, the Applicants respectfully request reconsideration and allowance of all pending claims.

Argument in Support of Allowance over Claim Rejections under 35 U.S.C. § 102

A claim is anticipated only if each and every element of the claim is found in a single reference. M.P.E.P § 2131 (citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in the claim." M.P.E.P. § 2131 (citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226 (Fed. Cir. 1989)).

In the Final Office Action, claims 1, 2, 4, 6-12, 14, 15, 17-20, 22, and 24 under 35 U.S.C. § 102(e) as being anticipated by *Roeck*. The independent claims 1, 11, and 19 have been amended to more clearly recite features of the claimed invention. Claim 1 is illustrative of the amendments, and now recites,

1. A method comprising:

tuning a receiver of a broadband cable signal associated with a first modulation technique to a channel within the broadband cable signal;

temporarily modifying receiver parameters to demodulate the channel according to a second modulation technique that differs from the first modulation technique associated with the broadband cable signal;

<u>*sweeping a carrier frequency of the receiver over a carrier loop bandwidth*</u> *for the receiver to attempt to obtain a channel lock while the receiver parameters are temporarily modified*;

and if a channel lock is obtained,

determining whether the channel is a data channel;

and if the channel is a data channel,

updating one or more operating parameters of the cable modem in accordance with the data channel. (Emphasis added)

Applicant respectfully asserts that claim 1, as amended, is patentable over the cited art.

As stated in the abstract, *Roeck* discloses apparatus, methods, and computer program products for detecting a viable data carrier in a downstream channel of a cable modem. In one embodiment, *Roeck* uses albeit a somewhat similar, yet clearly different scheme than the claimed invention for identifying a data carrier channel for a broadband cable modem signal.

In further detail, *Roeck* describes various details of their scheme in columns 9-11 generally, in view of the flowchart of Fig. 4. Details of the apparatus are shown in Fig. 5. As shown in the flowchart of Fig. 4 and described in the accompanying description in the specification, the *Roeck* scheme proceeds as follows:

At a step 406, the cable modem identifies a potential downstream channel. As is well-recognized in the art and discussed in the background section, cable channels are typically separated by a fixed frequency spacing (i.e., channel separation) from 90 MHz to 862 MHz in the United States, and from 102 MHz to 862 MHz in Europe. (See, e.g., Col. 9, lines 62-64.) As described in *Roeck* (Col. 11, line 9), one common channel spacing is 250 kHz. Accordingly, at a step 408 the cable modem sets the tuner to the

potential downstream frequency. In other words, the tuner is tuned to the nominal center frequency of the potential channel identified at step 406.

Next, at step 410, the internal amplifier is set to ensure the input signal level matches a predetermined fixed setting. As stated in column 10, lines 1-7,

> At a step 410, the CPU in the cable modem sets the internal amplifier to match the input signal level. The internal amplifier ensures that the signal itself has a fixed amplitude or energy level. The output from the amplifier is an intermediate frequency signal. *This is a <u>standard step</u> taken in a typical cable modem*. (Emphasis added)

At this point, *Roeck* has not done anything that wouldn't be done in tuning to a channel using a typical tuning scheme. However,

> At a step 412, the cable modem's receiver chip or demodulator is configured to check for a QPSK modulated signal. The receiver chip is configured by the cable modem CPU (Col 10, lines 7-10).

Following this,

> At a step 414 the cable modem attempts to acquire a particular baud rate by extracting a data clock (a constant frequency signal) from the received signal. As is known in the art, the data clock is converted to a logical pulse and informs the receiver in the cable modem when to take a "snap shot" of the data. In the described embodiment, the data clock is extracted using custom circuitry using I (in-phase) and Q (quadrature) values (Col. 10, lines 21-28).

At a step 416, the cable modem attempts to identify a constellation pattern in the signal. As described in *Roeck*, the downstream data channels will typically be modulated as one of QAM64 or QAM256. By using a QPSK "screening" process, a determination to whether the channel data might be modulated using QAM64 or QAM256 is determined by sampling the signal and the checking the signal to noise ratio (SNR) and determining if it exceeds a predefined threshold. If the signal is not modulated using QAM64 or QAM256, (such as an analog audio/video channel signal), there will be mostly noise, resulting in a low SNR. In contrast, a higher SNR ratio is predicted for either a QAM64 or QAM256 signal using the QPSK modulation filter.

The process is completed at steps 420 and 422, wherein if the SNR is above the predefined threshold, the cable modem attempts to identify the cable modem using the QAM64 and QA256 modulation scheme.

Under one embodiment of the claimed invention, the following scheme is employed. As stated at page 10, line 10 of the specification for the instant application,

> More particularly, in accordance with a first embodiment of the present invention, data channel detection agent 214 modifies certain of the cable modem parameters for low signal to noise ratio (SNR) and a wide auto-gain control (AGC) loop bandwidth and carrier loop bandwidth. Channel detection agent 214 then enables the adaptive equalizer (not shown) of QAM modulator in a QPSK mode, as the carrier frequency is swept over the entire bandwidth to obtain a lock. [In this instance the "entire bandwidth" refers to the entire bandwidth of the carrier loop bandwidth, not the entire bandwidth of the cable modem signal]. If a carrier frequency lock is achieved, the channel is a data channel and the equalizer is reset to the proper QAM mode (e.g., 64-QAM) as the rest of the QAM channel acquisition is continued. If frequency lock is not achieved, the channel is not a data channel, and the channel detection agent 214 moves to the next QAM channel, to perform the same check. (Text in brackets [] has been added.)

The element of sweeping the carrier frequency over the carrier loop bandwidth to obtain a channel lock has been added to each of the amended independent claims herein. Applicant respectfully asserts that this element is not taught or suggested by *Roeck*. More specifically, *Roeck* teaches away from using this scheme by implementing there own scheme which does not employ sweeping a carrier frequency over a carrier loop bandwidth, but rather tunes to a nominal channel frequency and then employs an amplifier to fix the signal amplitude at a predetermined value. Subsequently, the QPSK QAM-64 or QAM-256 detection scheme is applied. In addition, *Roeck* clearly does not teach or suggest "modifying receiver parameters to effect a low signal to noise ratio and a wide auto-gain control loop bandwidth," as recited in new claim 28.

The sweeping scheme of the present invention provides advantages over the *Roeck* scheme. Notably, actual channel frequencies within a cable broadband signal

may differ fairly significantly from the nominal center frequencies for the channels. This frequency error produces non-linear effects, similar to when one turns the tuner dial on an old-fashion radio (when the tuning is off by a relatively small amount one receives nothing but noise, while if it is off by a smaller amount the reception of the signal becomes significantly clearer). For example, the signal to noise ratio of an offset channel (that is a channel operating at a frequency that is offset from the nominal center frequency for the channel) will be lower than the signal to noise ratio of a centered channel. Since the *Roeck* scheme employs an amplifier to fix the amplitude of the signal, the signal to noise ratio of either case will not be changed, but rather both the signal and noise levels will simply be amplified. However, the *Roeck* scheme is predicated on not having such non-linear effects. It has a predetermined SNR threshold for each of the QAM-64 and QAM-256 modulation schemes. As a result, an actual data channel that has a carrier frequency that is offset from a nominal center frequency for the channel might produce a false "miss" under the *Roeck* scheme, since its SNR would be too low, failing the SNR threshold test at step 418 in Fig. 4.

Another argument in support of the patentability of claim 1 over *Roeck* is the fact that *Roeck* provides virtually no detail whatsoever of the internal structure of their receiver chip. The only details they show are a receiver chip 508 (Fig. 5), which is controlled by a CPU 510. In effect, and as discussed above, the CPU 510 can send a signal to the receiver chip 508 to cause the receiver chip to switch between a QPSK demodulation mode and a QAM demodulation mode. More specific details concerning the apparatus of Fig. 5 are recited in *Roeck* (Col. 11, line 52 to col. 12, line 29):

> FIG. 5 is a block diagram showing internal components of a cable modem in accordance with one embodiment of the present invention. A cable modem 500 takes as input a downstream channel having a frequency range of 86 mHz to 860 mHz in the United States or 50 mHz to 1 gHz in Europe. The first component to receiver a downstream channel is a splitter/combiner 502. The downstream channel is routed to a tuner 504. The tuner selects a particular input frequency from the downstream channel and outputs a radio, frequency at the particular frequency. For example, that frequency can be 86 mHz or the most recently used

> frequency, as described in step 406 of FIG. 4. In the described embodiment, *tuner 504 is a standard tuner found in cable modems and other devices that manipulate radio frequencies.*
>
> *An amplifier 506 ensures that the signal has a fixed amplitude regardless of input power level and, like the tuner, is a standard component found in cable modems.* The output from amplifier 506 is an intermediate frequency that is input to a receiver chip 508. *Receiver chip 508 is essentially a demodulator that attempts to decode the intermediate frequency data signal having a particular frequency. The analog signal from amplifier 506 is converted to a digital signal by receiver chip 508. As mentioned earlier, an important function of receiver chip 508 is to compare the digitized data signal to a particular constellation diagram. A CPU 510 in communication with receiver chip 508 can instruct the chip to compare the data signal to one of several constellation diagrams. As described above with respect to FIG. 4, the constellation diagrams of interest in the described embodiment of the present invention are those for QPSK, QAM64, and QAM256. This comparison is performed by receiver chip 508 operating in conjunction with CPU 510.* CPU 510 has its own memory 512 and is also in communication with tuner 504 and amplifier 506 and a media access control (MAC) unit 514. CPU 510 configures receiver chip 508 and other components in the cable modem. MAC unit 514 and other components in a cable modem are described in greater detail in U.S. application Ser. No. 08/962,231, filed on Oct. 31, 1997, entitled "Echo Device Method for Locating Upstream Ingress Noise Gaps at Cable Television Headends," commonly assigned, and incorporated by reference herein. Aside from setting parameters for and instructing components in cable modem 500, CPU 510 also performs the signal-to-noise ratio comparisons described in steps 418 and 422 of FIG. 4. (Emphasis added)

In sharp contrast, the receive module 206 employed by the apparatus and method of the present invention is shown in detail in Fig. 3 and discussed in detail in the specification for the present application. As shown in Fig. 3, acquisition/tracking loops 312 are employed to adjust numerically controlled oscillators (NCOs) in the feedback loops to adjust the auto-gain control loop bandwidth and the carrier loop bandwidth. This enables the receive module to “lock” onto a QAM-modulated channel using the QPSK/carrier frequency sweeping scheme described above.

With regard to the term “lock”, it is noted that *Roeck* uses a similar term – however, it meaning and context are clearly different. As stated in *Roeck*,

> M is a constant dependent on the modulation type: QPSK, QAM-64, or QAM-256. When the demodulation error E_i is high, then the SNR_{ave} will be low and vice versa. If the modulation type matches the symbols being received, then carrier lock is determined by comparing SNR_{ave} to a threshold. If $SNR_{ave} > SNR_{threshold}$, then carrier lock is declared. Typical threshold values without error correcting code are: SNR_{QPSK} =15 dB; $SNR_{QAM\text{-}64}$ =25 dB; and $SNR_{QAM\text{-}256}$ =35 dB (Col. 9, lines 12-20)

When considered in the context of the previous and following paragraphs (which are duplicated herein for simplicity), it is apparent that the carrier lock discussed above pertains to a conventional channel search scheme that does not employ the QPSK filter technique.

In summary, it is clear that *Roeck* does not teach or fairly suggest each and every element of amended independent claim 1. Accordingly, claim 1 is patentable over *Roeck*, and is now in condition for allowance. Similar amendments have been made to each of independent claims 11 and 19. Accordingly, each of these independent claims are patentable over *Roeck* for similar reasons to those presented above in support of the patentability of amended claim 1. Moreover, each of dependent claims 2, 4, 7-10, 12, 14, 15, 18, 20, 22, 24, and 25-29 is patentable for at least the same reasons as its respective base claim.

<u>Conclusion</u>

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, independent claims 1, 11, and 19 are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any

informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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